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Information Science and Technology Center Seminar

James Theiler
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"Anomalous Change Detection"

Wednesday, October 6, 2010
3:00 - 4:00 PM
TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

Abstract: Given two (or more) images of the same scene, taken at different times and under different conditions, identify the interesting changes that have occurred in the scene. In particular, distinguish these interesting changes from the uninteresting but inevitable differences due to everything from focus and white balance to shadows and parallax. An obvious ambiguity in this problem statement is the word "interesting" -- what does that mean, exactly? (or even approximately?) Sometimes, specific changes are sought: have illicit crops been planted? where is the flood damage? etc. But other times the aim is just to see if there are any unusual changes that had not been anticipated. It is this more open-ended question that anomalous change detection attempts to answer. In any operational scenario, a human analyst will have to evaluate whether the unusual change is interesting or not. But as long as the unusual changes are rare (and, by definition, they are), then this provides a way to point the analyst to a managable number of potentially interesting changes in what would otherwise be an overwhelming quantity of image data.Inspired by this problem statement, I and my LDRD funded team have been working on both practical and conceptual aspects of the anomalous change detection problem. This talk will overview some of that work, and will point to what I think are the most promising and (here comes that word again) interesting directions for further research.

Biography: Theiler received a Ph.D. in Physics from Caltech in 1987, with a thesis on statistical and computational aspects of identifying chaos in time series. He followed a nonlinear trajectory to UCSD, MIT Lincoln Laboratory, LANL, and the Santa Fe Institute. His interests in algorithmic data analysis and in having a real job were combined in 1994, when he joined the Space and Remote Sensing Sciences Group at Los Alamos. His professional enthusiasms include image processing, remote sensing, and machine learning. Also, covariance matrices.

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